

Clinican Guidance

E-cigarette or Vaping Product Use Associated Lung Injury (EVALI)

PATIENT SYMPTOMS

- shortness of breath
- cough
- fever
- nausea, vomiting
- chest pain



EXPOSURE HISTORY

- History of vaping in past 3 months



Consider 1-4 below if patient reports any of the above symptoms or exposures.

1

PERFORM IMAGING

- Chest X-ray and/or CT (as clinically indicated)



2

RULE OUT INFECTIOUS DISEASE

- Influenza test (PCR if available)
- Respiratory virus panel or respiratory pathogen panel (as clinically indicated and available)
- *Legionella* and *Strep pneumoniae* urine antigen (as clinically indicated)
- *Mycoplasma* PCR (as clinically indicated and available)
- Blood culture if febrile
- Inflammatory markers/liver transaminases
- CBC with differential and platelets
- Other tests (as clinically indicated)



If BAL/biopsy performed (as clinically indicated)

- Gram stain and bacterial cultures
- Fungal stains/fungal cultures
- Acid-fast bacilli smear and mycobacterial cultures
- Respiratory virus or pathogen panel
- Pneumocystis PCR or pneumocystis specific stain (as clinically indicated)
- Lipid Oil Red stain (if available)
- Other tests as clinically indicated

3

TOXICOLOGY EVALUATION

- Urine drug testing (as clinically indicated)*



4

OTHER TESTING FOR PULMONARY PROCESSES (as clinically indicated)

- Rheumatologic, malignancy, cardiac, etc.

5

REPORT TO UDOH - PH: 801-538-6191

FAX: 801-538-9923 Email: epi@utah.gov

- For patients with abnormal radiographic findings; frequent findings are bilateral patchy infiltrates on X-ray or ground-glass on CT.
- If clinical specimens collected, retain earliest blood and urine.
- Retain BAL or biopsy if performed.

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CONSIDER CORTICOSTEROIDS IF APPEARING TO BE VAPING LUNG INJURY

- Advise consultation with pulmonary specialist to determine need for corticosteroids and dosing.
- If admitted, consider consultation with infectious disease specialist and further infectious disease workup that could include endemic mycoses and other pathogens.
- Some clinicians have found it helpful to consult with an endocrinologist for patients prescribed high-dose steroids for longer durations.

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CARE POST-DISCHARGE

- If outpatient, follow-up with patient within 48 hours to determine if symptoms have progressed.
- When discharged, schedule follow-up with patient; consult a pulmonologist as necessary to assess recovery.
- Many cases have nicotine and other substance addition; in addition, many cases are noted to have anxiety and/or depression. Referral to specialists in these areas are an important part of treatment.
- Patients with symptoms, but who do not have evidence of disease on imaging, should be counseled to return if symptoms progress.

*Per CDC Recommendations - Given the limitations of the sensitivity and specificity of urine drug screen, this decision should be left to the clinician.

Clinical presentation of patients with lung injuries associated with vaping, and other special considerations

Clinical presentation of patients with lung injuries associated with vaping has included shortness of breath, fever, cough, chest pain and gastrointestinal symptoms (nausea, vomiting, abdominal pain), typically with radiographic abnormalities, in the setting of recent or active use of nicotine or THC vaping. Other symptoms may include headache and weight loss. Symptoms generally progress over days to weeks. Severity of imaging results may be variable, but often chest radiographs demonstrate bilateral opacities and CT imaging demonstrates diffuse ground glass opacification. Inflammatory markers are typically elevated. Infectious, rheumatologic and other disease process evaluations are usually negative or do not fully explain the extent of lung disease otherwise seen. Patients often require hospital admission for hypoxia and some require ventilator support.

Close follow-up advised

Many patients seek care as an outpatient at least once prior to hospital admission. Because symptoms can progress without therapy, patients who do not appear to have a vaping-related lung injury at the time of initial clinical encounter or who are presenting early in the clinical course require close follow-up. It is strongly recommended to follow-up with these patients within 24 to 48 hours. Consultation with specialists as needed is recommended.

Steroids and other treatment

Clinical improvement of patients has been reported with corticosteroid use. Currently there is insufficient outcome evidence to recommend use of steroids on a routine basis. The decision to use corticosteroids should be made based on risks and benefits and the likelihood of other etiologies. Aggressive supportive care is warranted, and the decision to use or defer corticosteroids may benefit from consultation with pulmonology and medical toxicology. Consider lung function testing at follow up or referral to a pulmonologist. Referral to addiction medicine should also be considered. Please consult with addiction specialists in your area.

- Report suspected cases to your **local health department** or the **Utah Department of Health (UDOH)** as soon as possible by one of these methods:
- Call UDOH at **6191** -h@u = .
- Fax the **EVALI Case Report Form to 8 9923**
- Email the **EVALI Case Report Form to epi@utah.gov**.

Resources

- CDC EVALI Guidance for Clinicians: <https://www.cdc.gov/mmwr/volumes/68/wr/mm6841e3.htm>
- Utah Department of Health Lung Injury Outbreak: <https://health.utah.gov/lung-disease-investigation>
- Update: Characteristics of Patients in a National Outbreak of E-cigarette, or Vaping, Product Use–Associated Lung Injuries — United States, October 2019 https://www.cdc.gov/mmwr/volumes/68/wr/mm6843e1.htm?s_cid=mm6843e1_e&deliveryName=USCDC_921-DM11790
- CDC Health Advisory (HAN), Issued 8/30/19: <https://emergency.cdc.gov/han/han00421.asp>
- CDC Guidance for Clinicians: Clinician Outreach and Communication Activity (COCA) Clinical Action Message: <https://emergency.cdc.gov/newsletters/coca/081619.htm>
- For Healthcare Providers, CDC 10/28/2019: https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease/healthcare-providers/index.html
- Evaluating and Caring for Patients with Suspected E-cigarette or Vaping Product Use Associated Lung Injury (EVALI) https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease/healthcare-providers/pdfs/evaluating-caring-evali-patients.pdf
- Drop-boxes are available at many local Sheriff Stations 24-hours a day and are a safe and confidential way to discard of vaping related products. <http://utahtakeback.org/>

Clinician Guidance for E-cigarette or Vaping Product Use Associated Lung Injury (EVALI) Clinical Sample Collection Guidelines

The Utah Department of Health (UDOH), Utah Public Health Laboratory (UPHL), Local Health Departments (LHDs), and the Centers for Disease Control and Prevention (CDC) are requesting clinical samples for reported cases. When samples are available and clinically indicated, please consider sending the following clinical samples to UPHL. Samples can be forwarded using standard couriers and packaging. Each sample should include a Lung Disease Investigation Sample Request Form. Contact UDOH at 801-538-6191 or rcheng@utah.gov with any questions.

Blood samples

1. For each patient, collect up to 8 mL of blood in two (2) 4-mL **PURPLE**-top (K2 -EDTA) glass or plastic tubes. If only 3-mL tubes are available, three (3) 3-mL tubes may be collected. **NOTE: DO NOT** use gel separators.
2. Mix contents of tubes by inverting them 5 or 6 times.
3. Label tubes in order of collection. Example: #1, #2, #3.
4. Place a barcode label on each tube so that the barcode looks like a ladder when the tube is upright.
5. Store blood samples at 1°C to 10°C. **DO NOT FREEZE** if prompt transfer to state lab is anticipated.
6. If transfer to state lab is expected to be longer than six (6) hours. Separate plasma from whole blood cells within six (6) hours of collection. Aliquot plasma into cryotubes.

Urine samples

1. For each patient, store 40 to 60 mL of urine in a screw-cap urine cup.
2. Place barcoded label on the cup when upright; the barcode will look like a ladder.
3. Indicate on the cup how the sample was collected if the method was other than “clean catch.” (Example: catheterization)
4. **Store urine samples in the freezer.** Freezer temperatures of -20°C or lower are recommended.

Bronchoalveolar lavage fluid (BAL fluid)

1. **Optimal timing.** These specimens may be obtained at any time during the clinical course, but ideally prior to initiation of antimicrobial or steroid therapy. If antibiotics or steroids have been initiated, course and duration should be noted.
2. **Specimen collection: BAL fluid**
 - a. Collect specimens in sterile containers.
 - b. BAL fluid should undergo culture and routine centrifugation followed by cellular analyses and cytopathology, including lipid and other staining, as clinically indicated at the local institution.

Lung biopsy tissue specimens

1. The decision to perform a lung biopsy is at the discretion of the clinical treatment team. This will include consultation with pulmonary, critical care, or other specialties.
2. Initial evaluation of biopsy tissues at the clinical institution should be guided by consultation with these specialties and pathology specialists.
3. Evaluation can include lipid staining on fresh lung tissues, histopathologic evaluation of formalin-fixed, paraffin-embedded (FFPE) tissues, and testing for possible infectious etiologies.
4. CDC can receive formalin-fixed (wet) tissues or FFPE lung tissue blocks for evaluation, if available from a biopsy procedure.